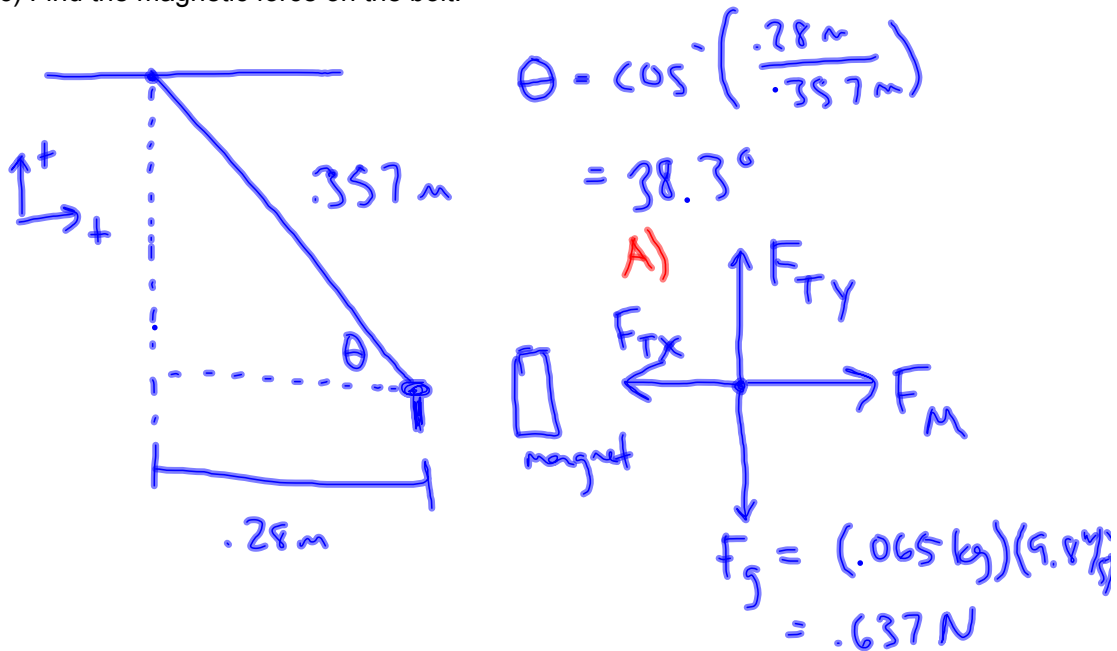


## Force Practice Problem AP Physics 9.9.11

An iron bolt of mass 65.0 g hangs from a string 35.7 cm long. The top end of the string is fixed. Without touching it, a magnet attracts the bolt so that it remains stationary, displaced horizontally 28.0 cm to the right from the previously vertical line of the string.

- Draw a free-body diagram of the bolt.
- Find the tension in the string.
- Find the magnetic force on the bolt.



$$C) \quad \Sigma F_x = 0 \quad B) \quad \Sigma F_y = 0$$

$$F_{Tx} - F_M = 0$$

$$F_{Ty} - F_g = 0$$

$$F_{Tx} = F_M$$

$$F_{Ty} = F_g = 0.637\text{ N}$$

$$F_M = .806\text{ N}$$

$$\sin(38.3^\circ) = \frac{F_{Ty}}{F_T}$$

$$F_T = \frac{F_{Ty}}{\sin(38.3^\circ)} = \frac{.637\text{ N}}{\sin(38.3^\circ)} = 1.03\text{ N}$$

$$\tan(38.3^\circ) = \frac{F_{Ty}}{F_{Tx}}$$

$$F_{Tx} = \frac{F_{Ty}}{\tan(38.3^\circ)} = \frac{.637\text{ N}}{\tan(38.3^\circ)} = .806\text{ N}$$